Claims:

1.   A method for generating a surface printed with tags, the tags embedded with data, the method comprising the steps of:

5.   printing, using an encoder having two or more rendering engines, a pattern of tags, each tag having a data area comprising data dots and a locator component comprising constant dots;

          using the tag encoder to obtain tag data from a tag format structure, the tag format structure being a dot based data package template containing a plurality of entries, there being an entry associated with each dot's position, an entry indicating whether a data dot or a constant dot,

10   accordingly each entry having either fixed data bits or variable data bits, and further;

          interpreting each entry independently without reliance on state information.

2.   The method of claim 1, wherein:

          a first rendering engine processes one part of the surface and a second engine processes a

15   different part of the surface.

3.   The method of claim 1, wherein:

          a first rendering engine processes one part of a tag and a second engine processes a different part of the same tag.

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4.   The method of claim 1, wherein:

          each entry of the tag format structure comprises bits including a selected bit and the entry is interpreted as indicating a data bit, or not, according to the selected bit.

25   5.   The method of claim 4, further comprising the step of:

          determining if the selected bit indicates that the entry is data, then interpreting a remainder of the entry as an address.

6.   The method of claim 1, wherein the tag format structure is comprised of one or more lines and

30   further comprising the steps of:

          scaling the tag by a factor of N, by scaling the number of entries in the tag format structure; and scaling the tag format structure by replication of each entry N times and by replication of each line N times.

35   7.   The method of claim 1, further comprising the step of:

          providing a tag format structure in which dot positions have a relationship and the relationship takes into account a redundancy encoding of the data.

8.   The method of claim 1, further comprising the steps of:
        using the tag encoder to redundantly encode the data bits to conserve bandwidth.

5   9.   The method of claim 1, further comprising the step of:
        redundantly encoding entries in the tag format structure.

10.   The method of claim 1, further comprising the step of:
        providing the encoder with an input which defines the structure of a tag.

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11.   The method of claim 1, further comprising the step of:
        providing the encoder with an input which defines whether or not to redundantly encode the variable data bits or to treat the variable data bits as having been encoded.

15 12.   The method of claim 1, further comprising the step of:
        providing the encoder with an input which defines whether or not to redundantly encode the fixed data bits or to treat the fixed data bits as having been encoded.

13.   The method of claim 1, further comprising the step of:
20   providing the encoder with an input comprising a number of variable data bit records, each record containing one or more variable data bits for the one or more tags on a given line of tags.

14.   The method of claim 1, further comprising the step of:
        printed the tags with an infrared absorptive ink that can be read with a tag sensing device.

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15.   The method of claim 1, further comprising the step of:
        using the encoder to merge encoded tag data with a basic tag structure and place dots in at least one output FIFO in a correct order for subsequent printing.

30 16.   The method of claim 1, further comprising the step of:
        generating encoded tag data from original data bits on-the-fly to minimize buffer space.

17.   The method of claim 1, further comprising the step of:
        printing each tag so as to have a background pattern further comprising a locator component.

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18.   The method of claim 17, wherein:
        the locator component is circular.

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19. The method of claim 9, further comprising the step of:
performing the encoding using double indirection encoding.

5 20. The method of claim 1, further comprising the step of:
printing the dots as continuous tone dots.